

1966 OPERATING SUMMARY

STRATFORD
water pollution
control plant

ONTARIO WATER RESOURCES COMMISSION

Division of Plant Operations

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ONTARIO WATER RESOURCES COMMISSION
OFFICE OF THE GENERAL MANAGER

Members of the Stratford Local Advisory Committee,
City of Stratford.

Gentlemen:

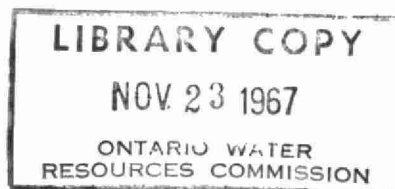
We are pleased to submit to you the 1966 Operating Summary for the
Stratford Water Pollution Control Plant, OWRC Project No. 57-S-2.

It is hoped that our joint participation in efforts to combat water pollution
will have even more success in the coming year.

Yours very truly,

A handwritten signature in dark ink, appearing to read "D. S. Caverly", is written over the typed name.

D. S. Caverly,
General Manager.





ONTARIO WATER RESOURCES COMMISSION

801 BAY STREET
TORONTO 5

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J. H. H. ROOT, M.P.P.
VICE-CHAIRMAN

D. S. CAVERLY
GENERAL MANAGER

W. S. MACDONNELL
COMMISSION SECRETARY

General Manager,
Ontario Water Resources Commission.

Dear Sir:

I am happy to present you with the 1966 Operating Summary for the Stratford Water Pollution Control Plant, OWRC Project No. 57-S-2.

The report offers a concise summary of operating data for the year and comparisons with previous years where these are applicable and significant.

Yours very truly,

A handwritten signature in cursive script, appearing to read "B. C. Palmer".

B. C. Palmer, P. Eng.,
Director,
Division of Plant Operations.

FOREWORD

● This operating summary contains complete information on the management of the project during 1966. It contains a concise review of the year's plant operation, significant financial details, and a visual presentation in graphs and charts of technical performance.

The information will be of value to interested parties in assessing the adequacy of the project at this time and its ability to meet future requirements.

The report is the result of co-operation by several groups within the Division of Plant Operations. These include the statistics section and the technical publications section. The Division of Finance and the draughting section of the Division of Sanitary Engineering were also closely associated with its publication.

The Regional Operations Engineer, however, has had the primary responsibility for the content, and will be happy to answer any questions regarding it.

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STRATFORD
water pollution control plant
operated for

THE CITY OF STRATFORD

by the

ONTARIO WATER RESOURCES COMMISSION

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Assistant Director:	C. W. Perry
Regional Supervisor:	A. C. Beattie
Operations Engineer:	P. J. Osmond

801 Bay Street Toronto 5

'66 REVIEW

The following report gives in detail significant data on the operation of the various treatment units at the Stratford Water Pollution Control Plant.

With an average daily flow of 3.07 million gallons, the plant is operating at approximately 77% of its full treatment capacity of 4.0 million gallons per day. Future sanitary sewer extensions will gradually increase the flow to the design value.

Plans are completed to construct facilities for chlorination of the final effluent. The addition of chlorine to the final effluent, to produce a residual of 0.5 ppm, is sufficient to kill most of the pathogenic bacteria. Chlorination equipment can be expected to increase the operating costs of the plant.

The 1966 operating costs increased about 3.6% over 1965. The treatment cost of \$52.77 per million gallons has increased from the 1965 value of \$49.96. Both are considered economical. It is well to note, however, that both cost to the average family and cost per pound of BOD removed have both decreased.

Under the supervision of head office engineers, the plant staff has maintained a clean, attractive and efficient plant for the City of Stratford. A special emphasis is placed on public relations and aesthetic qualities of the plant. Each year many tourists and groups tour the facilities.

PROJECT STAFF

Casual labour is utilized particularly during the summer months to provide relief during vacations, sick leave and heavy work load periods. The plant is staffed 12 hours per day during the week and 8 hours per day on both Saturday and Sunday.

Mr. J. Craig, an operator since January 1962, resigned in May to take a chief operator's position in Elmira and was replaced by Mr. J. Jansen, who started work in July. Mr. R. Tuer received his Certificate of Qualification as a Maintenance and Construction electrician and also attended the Basic Sewage Works Operators' course during the year. Mr. Biggin attended the OWRC sponsored Chief Operators' Conference in Toronto and the C.I.F.C. Convention in Windsor. Both functions were held in October.

PROJECT COSTS

NET CAPITAL COST (Final)	\$925,309.42
DEDUCT - Payments from Municipalities	<u>309.42</u>
Long Term Debt to OWRC	<u>\$925,000.00</u>
Debt Retirement Balance at Credit (Sinking Fund) December 31, 1966	<u>\$185,063.49</u>
Net Operating	\$ 59,148.93
Debt Retirement	18,667.00
Reserve	4,907.34
Interest Charged	52,042.63
TOTAL	<u>\$134,765.90</u>

RESERVE ACCOUNT

Balance at January 1, 1966	\$ 60,007.44
Deposited by Municipality	4,907.34
Interest Earned	3,217.56
	<u>\$ 68,132.34</u>
Less Expenditures	7,500.00
Balance at December 31, 1966	<u>\$ 60,632.34</u>

MONTHLY OPERATING COSTS

MONTH	TOTAL EXPENDITURE	PAYROLL	CASUAL PAYROLL	FUEL	POWER	CHEMICAL	GENERAL SUPPLIES	EQUIPMENT	REPAIRS & MAINTENANCE	* SUNDRY	WATER
JAN	2685.01	2415.65					95.09	111.51	62.76		
FEB	4199.83	2339.78			493.20		179.74		101.00	1034.03	52.08
MARCH	4816.10	2482.75		25.94	418.77	142.48	193.70	59.74	413.11	1027.48	52.08
APRIL	4859.73	3654.69		152.06	476.01		223.31		86.95	214.63	52.08
MAY	5293.58	2412.29	267.82		438.20		325.79	239.69	275.06	1282.63	52.10
JUNE	5785.28	2308.64	399.49		542.23		382.81	151.56	610.00	1338.45	52.10
JULY	4582.46	2299.37	194.72		512.23		336.50	183.31	161.83	842.40	52.10
AUG	5964.39	2524.21	269.25		538.63		69.14	118.50	245.29	2147.27	52.10
SEPT	6152.18	3663.46	160.32		578.63		201.38		449.16	1047.13	52.10
OCT	4264.15	2296.55			545.03	55.20	260.76		399.80	654.71	52.10
NOV	5252.75	2464.80			558.63		141.08		995.30	1040.84	52.10
DEC	5293.47	2482.80			567.83		428.52	64.18	38.05	1654.09	58.00
TOTAL	59148.93	31344.99	1291.60	178.05	5669.39	197.68	2837.82	928.49	3838.31	12283.66	578.94

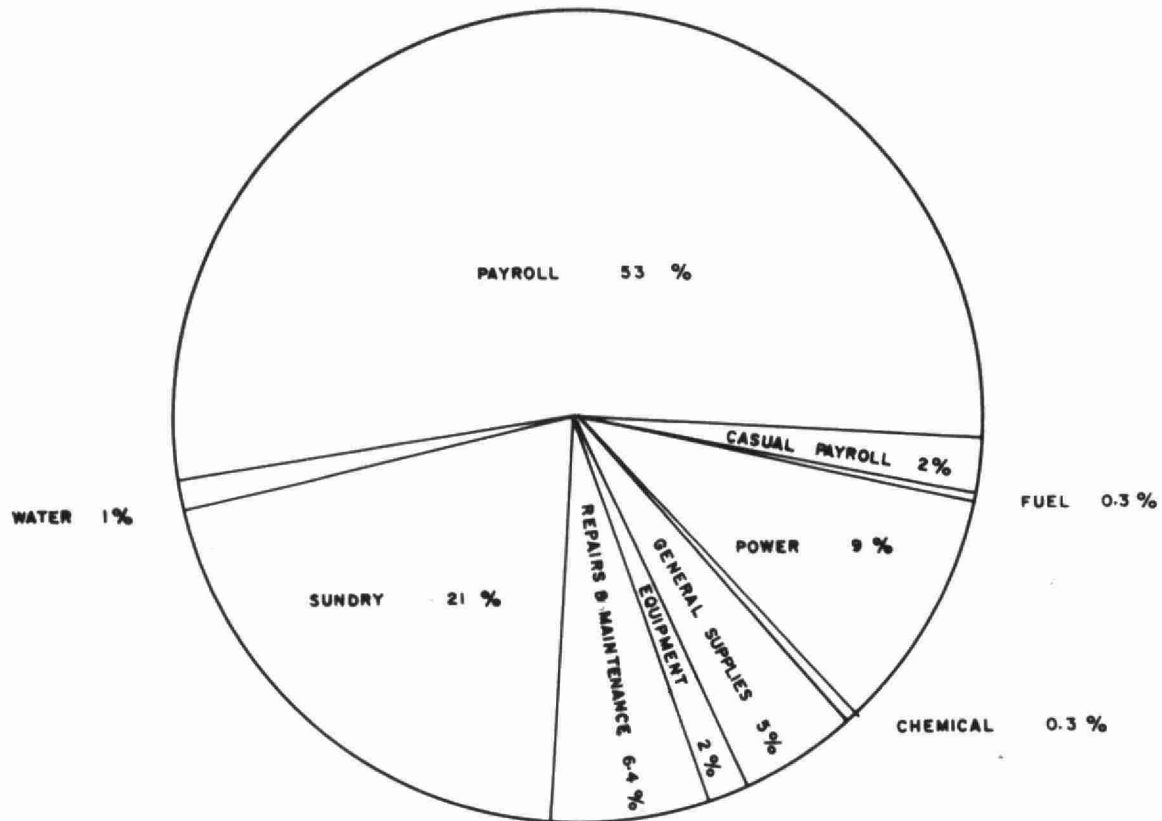
* SUNDRY INCLUDES SLUDGE HAULING COSTS WHICH WERE \$10337.60

YEARLY OPERATING COSTS

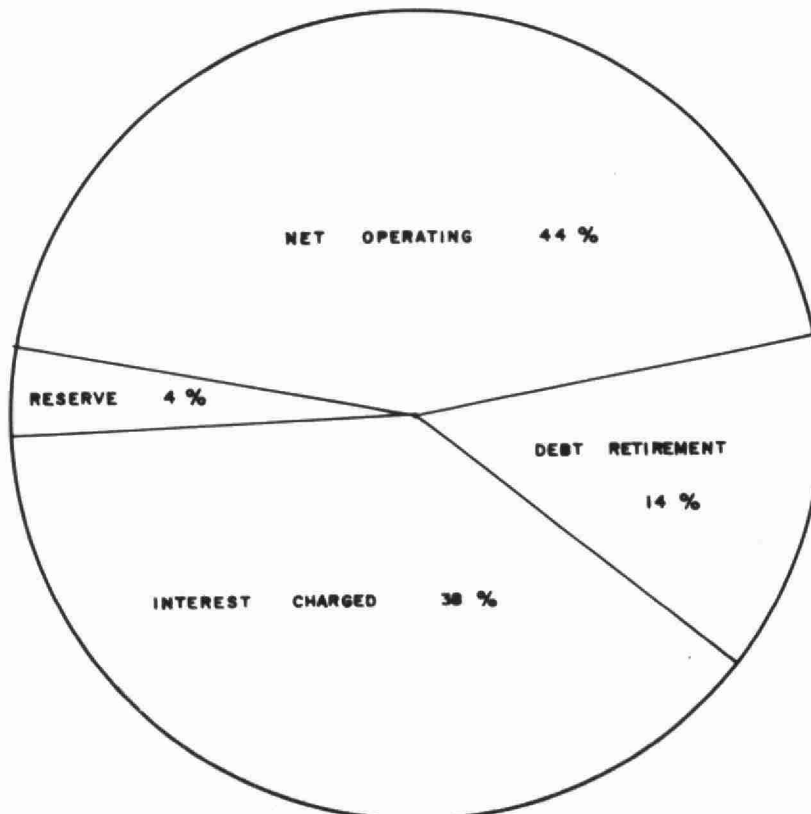
YEAR	M.G. TREATED	TOTAL COST	COST PER FAMILY PER YEAR	COST PER MILLION GALLONS	COST PER L.B. OF BOD REMOVED
1961	933.41	\$55015.86	* \$10.30	\$58.94	2 CENTS
1962	765.39	48157.96	9.01	62.92	3 CENTS
1963	774.22	52799.80	9.87	68.15	3 CENTS
1964	994.33	53649.88	9.59	53.95	3 CENTS
1965	1142.53	57079.98	10.22	49.96	3 CENTS
1966	1120.84	59148.93	10.10	52.77	2 CENTS

* BASED ON ANNUAL POPULATION ESTIMATE AND 3.9 PERSONS PER FAMILY

1966 OPERATING COSTS



TOTAL ANNUAL COST

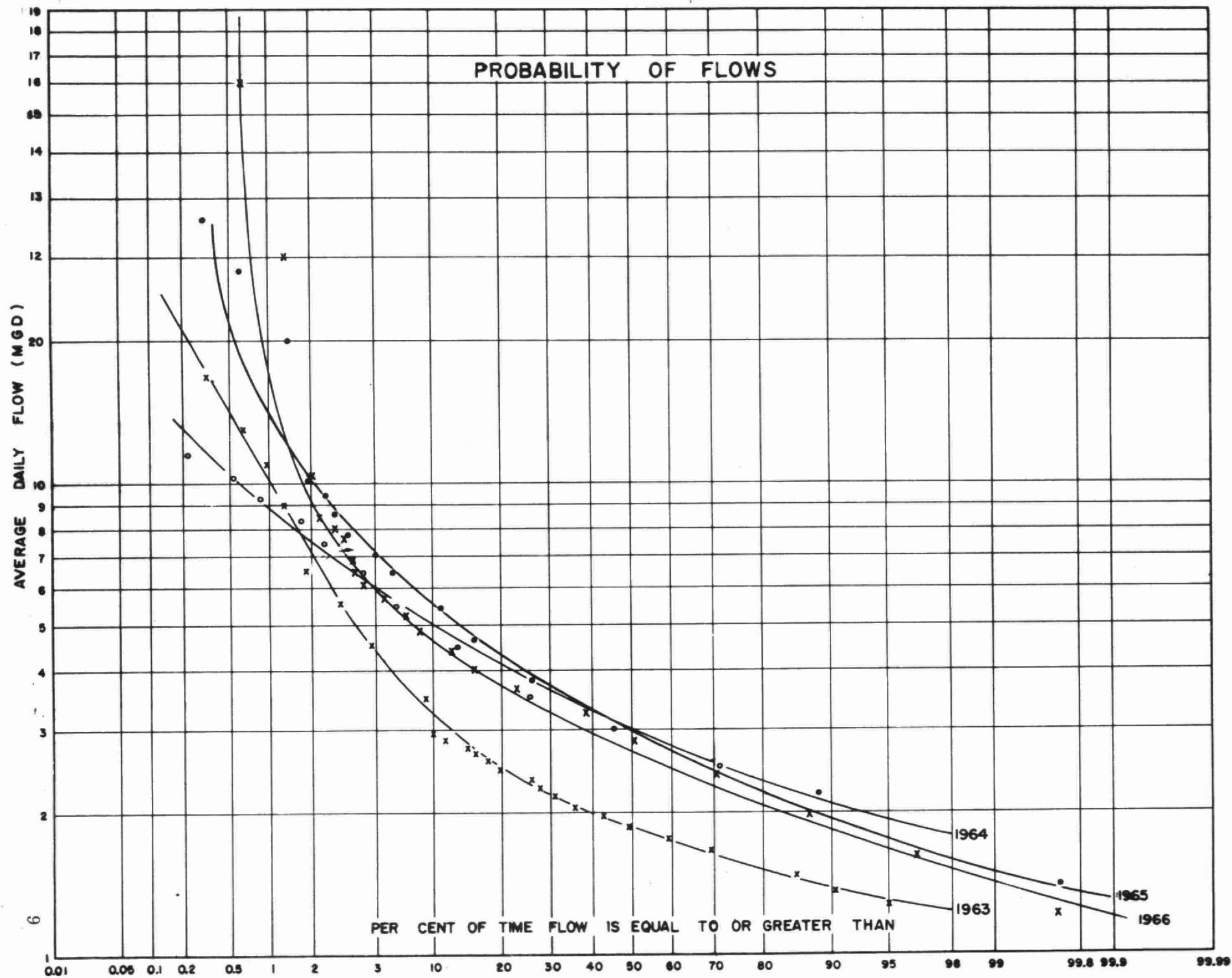


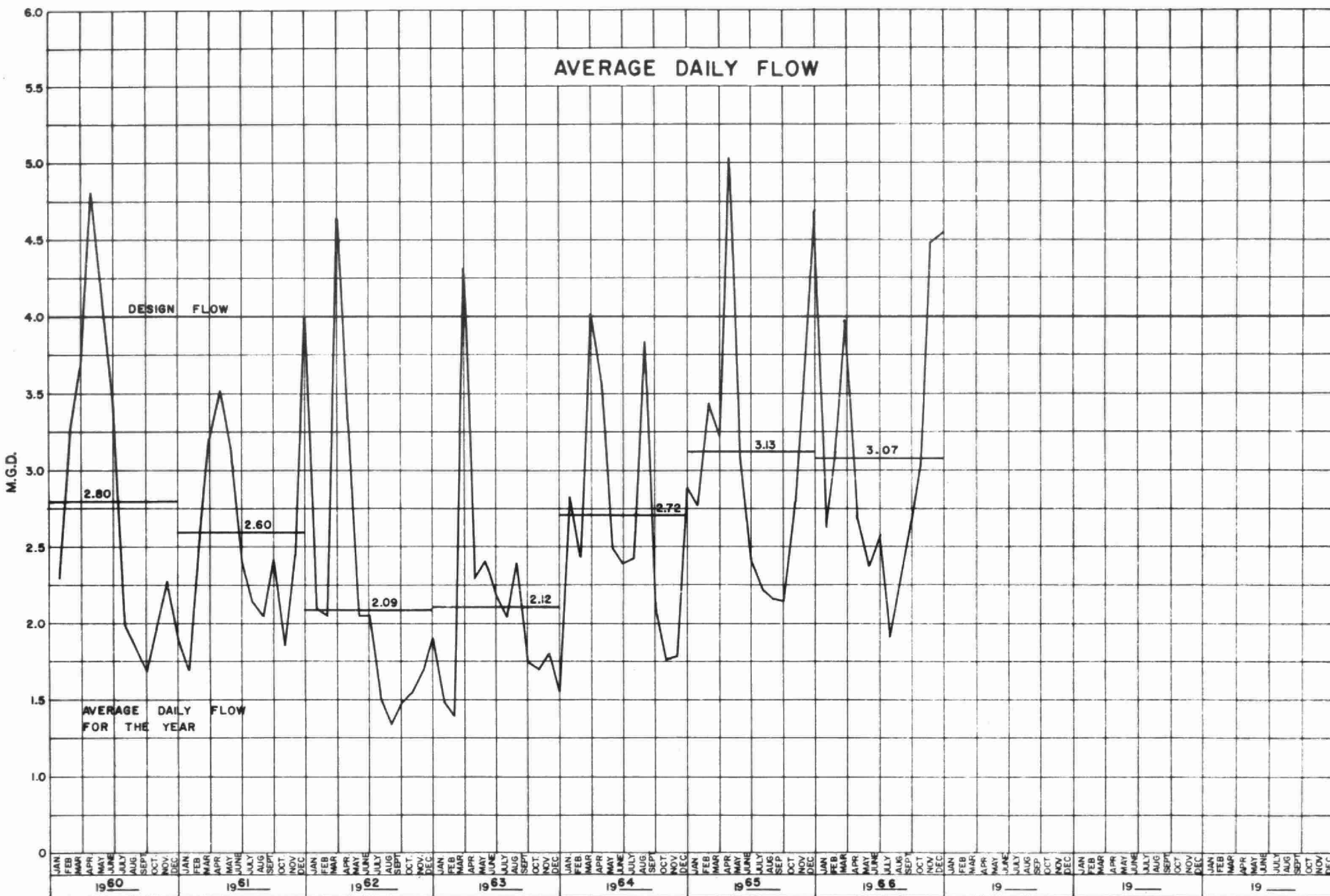
Process Data

The average daily flow and total flow for the year were slightly decreased over the 1965 flows. During 1966, the average daily flow was 3.07 million gallons, a decrease of 2% from the average of 3.13 million gallons per day received during 1965; 1120.84 million gallons of raw sewage composed of both industrial and domestic wastes received complete treatment.

The maximum 24 hour flow in the past year was 16.19 million gallons and occurred in the month of December. The maximum rate of flow recorded was not measurable. However, it exceeded 17 MGD. The versatility in design of this plant enables flow rates up to 8 million gallons per day to receive complete treatment for short periods. In addition, two of the primary tanks are used as storm units and can be used to store flash flood waters for treatment when the flow subsides. Primary treatment can be given to flow rates up to 16 million gallons per day. For these reasons, it is only on very rare occasions that any part of the flow must be bypassed.

The flow probability curves are compound, the steeper sloped portion representing storm flows and the lesser sloped portion representing normal dry weather flows.

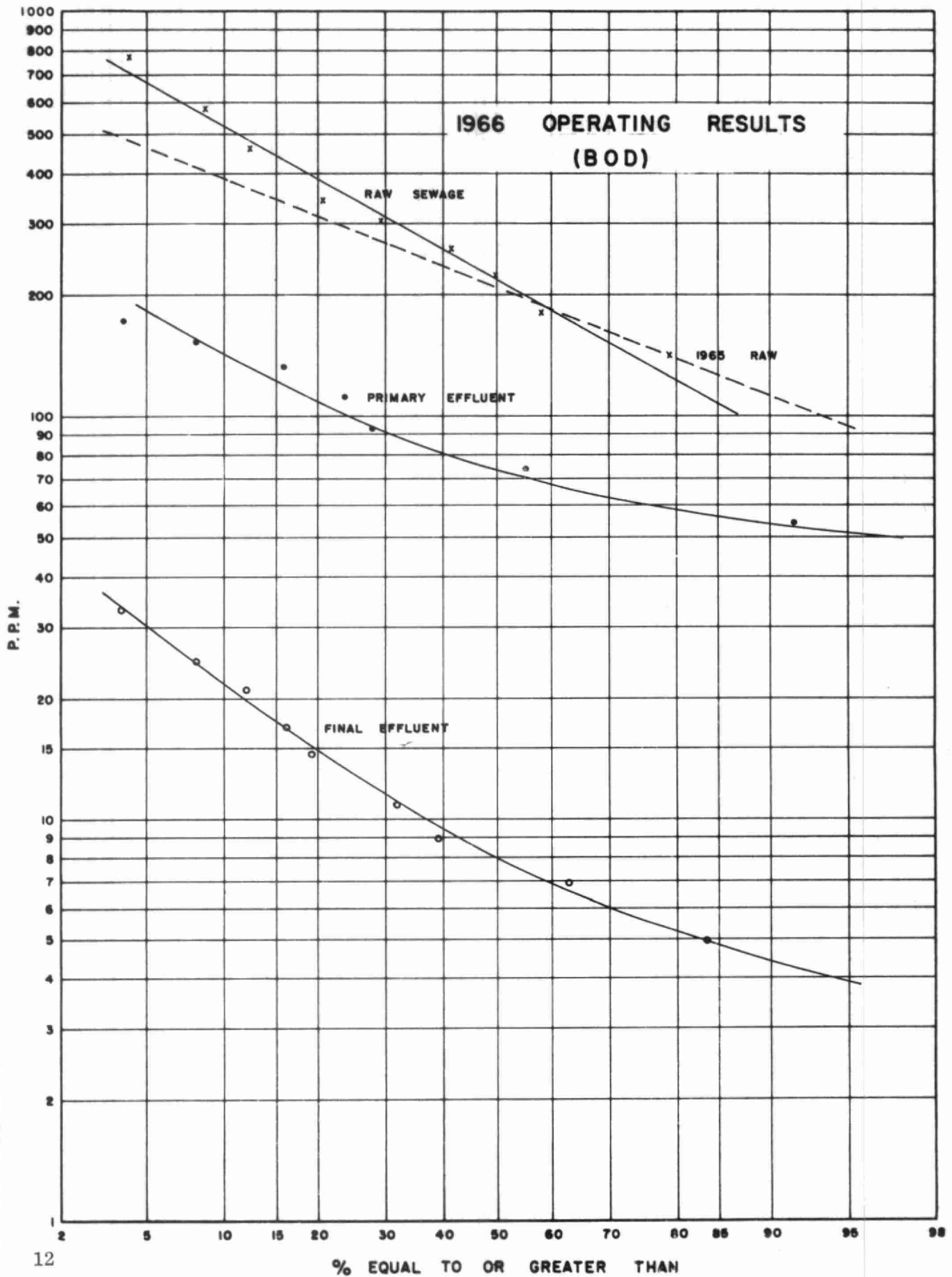


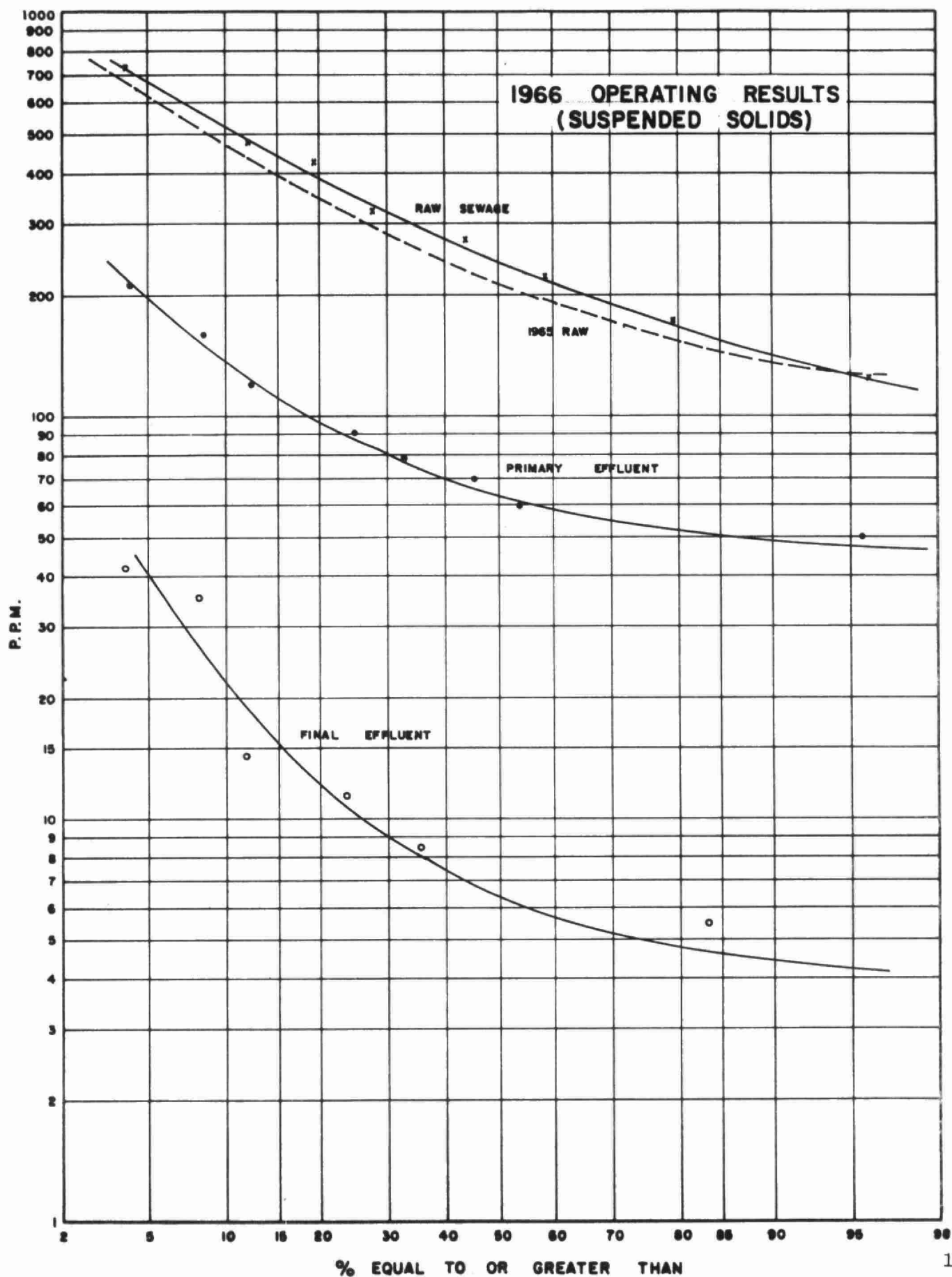


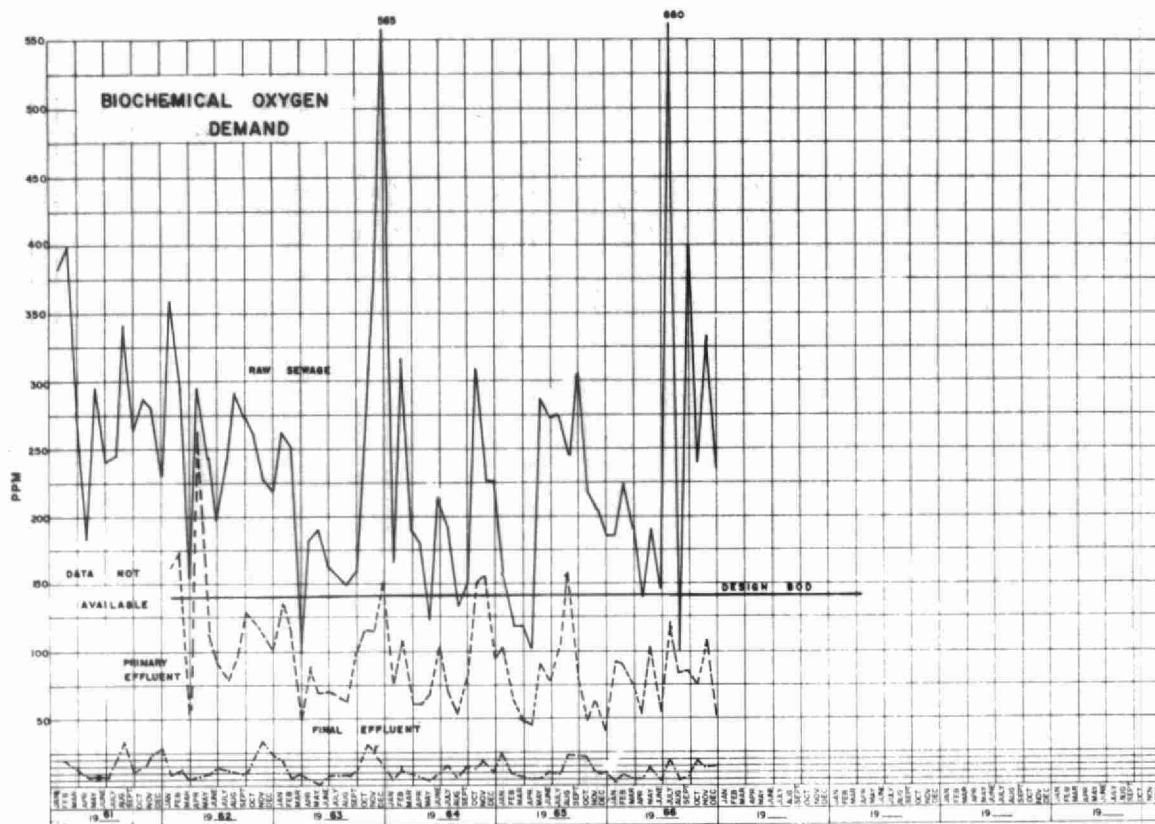
FLOW DATA

Month	Plant Flow (MG)	Avg. Daily Flow (MG)	Min. Day (MG)	Max. Day (MG)
JANUARY	79.82	2.58	1.37	4.76
FEBRUARY	87.13	3.11	1.67	11.79
MARCH	122.02	3.94	2.48	5.67
APRIL	80.13	2.67	1.44	4.23
MAY	73.62	2.38	1.34	3.92
JUNE	76.07	2.54	1.56	7.50
JULY	58.28	1.88	1.02	2.76
AUGUST	* 95.17	-	-	-
SEPTEMBER	79.48	2.65	1.82	3.43
OCTOBER	95.10	3.06	2.02	4.91
NOVEMBER	133.84	4.46	2.31	11.41
DECEMBER	140.18	4.52	1.26	16.19
TOTAL	1120.84	-	-	-
AVERAGE	93.40	3.07	-	-

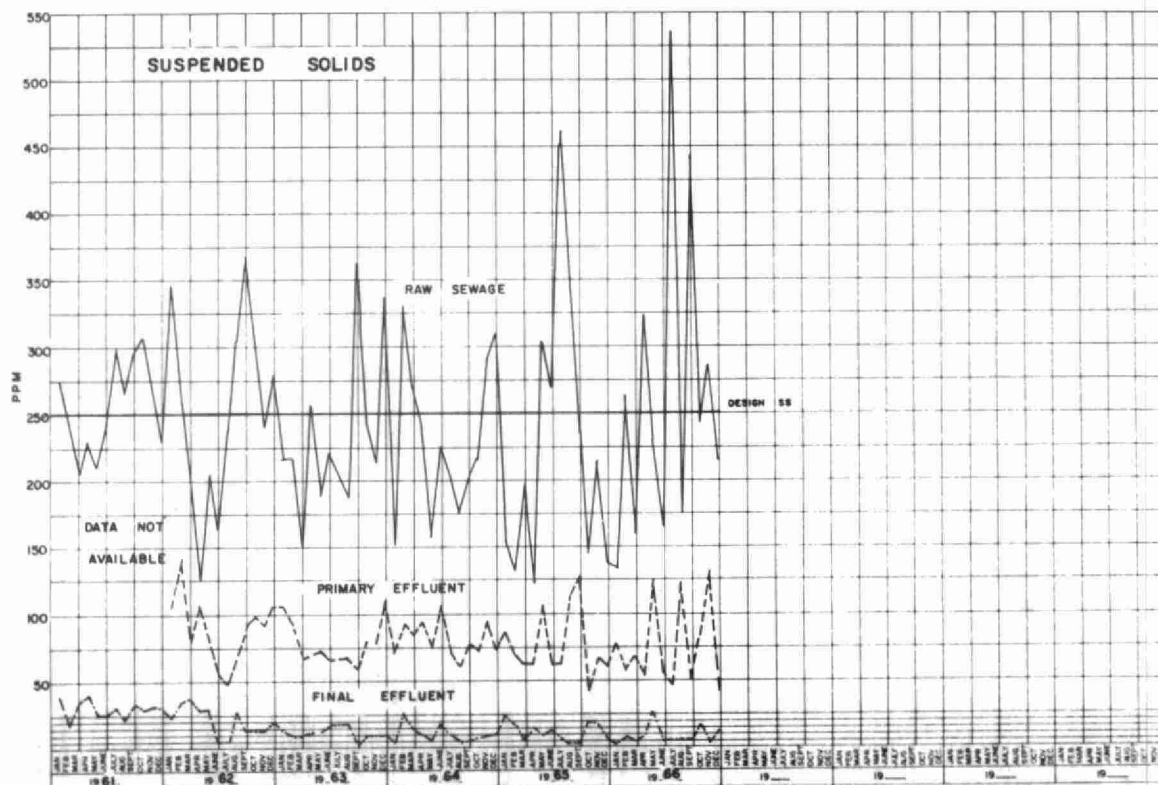
*Meter out of service. Monthly flow prorated on 3.07 mgd.







MONTHLY VARIATIONS



GRIT, B.O.D AND S.S. REMOVAL

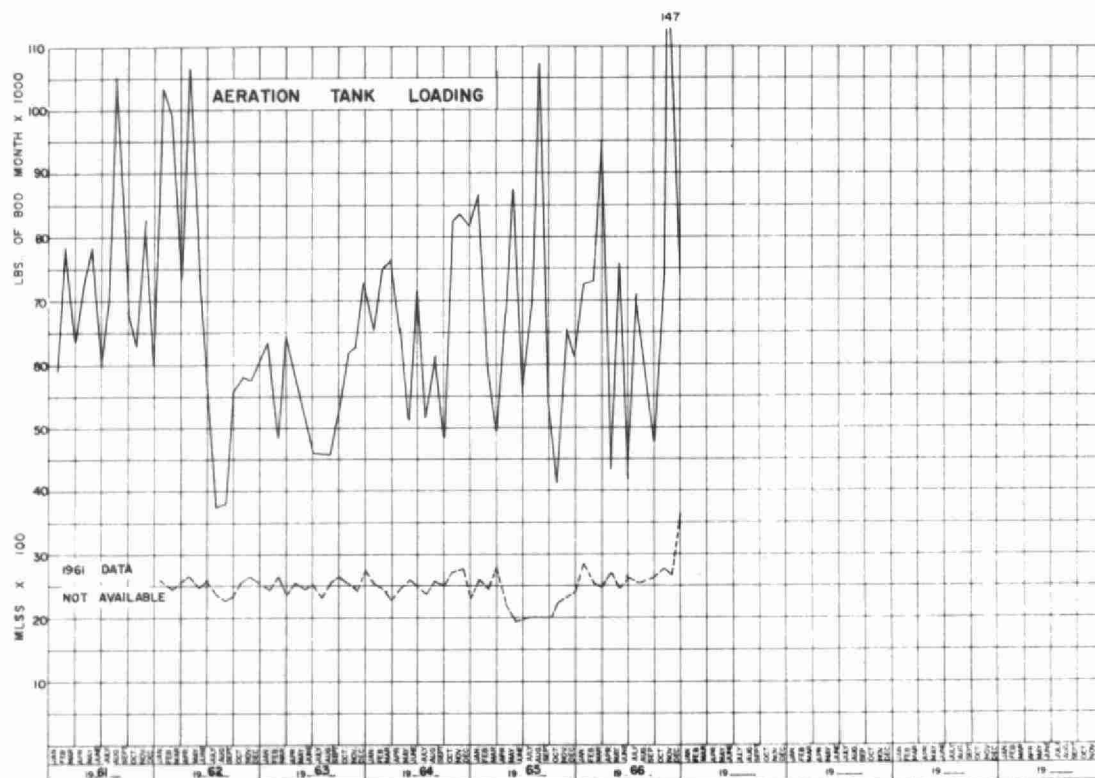
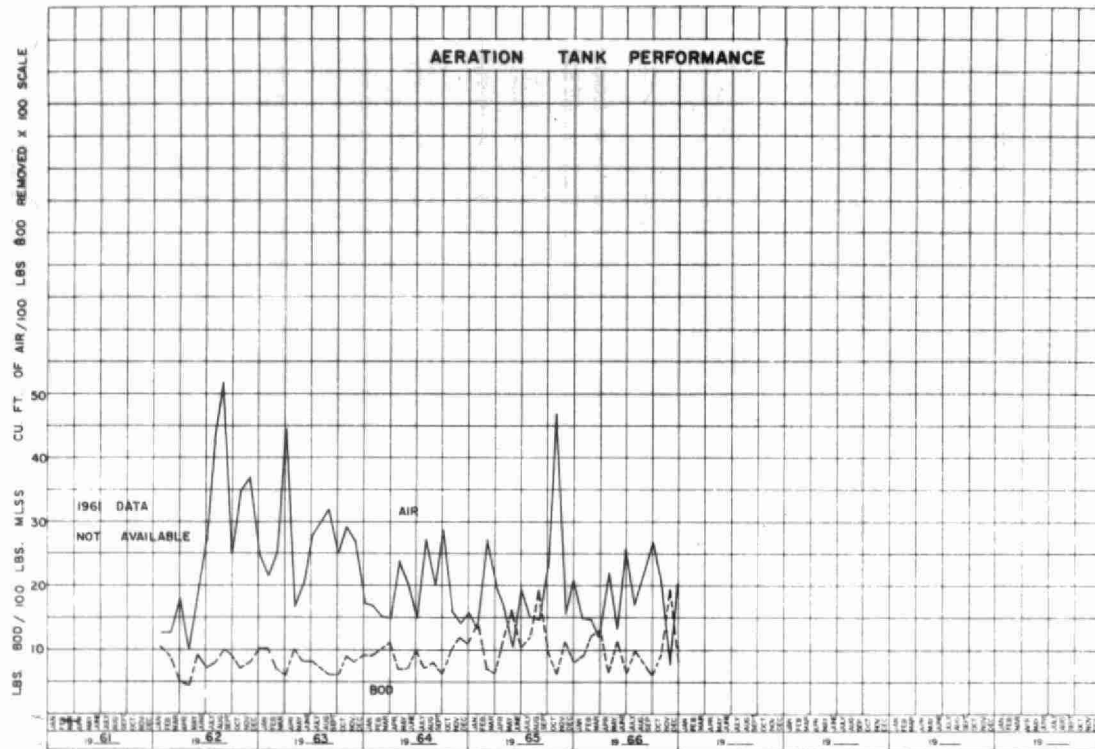
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MONTH	B. O. D.				S. S.				GRIT REMOVAL CU. FT.
	INFLUENT PPM.	EFFLUENT PPM.	% REDUCTION	TONS REMOVED	INFLUENT PPM.	EFFLUENT PPM.	% REDUCTION	TONS REMOVED	
JAN.	185	4	98.0	72.2	132	3	97.5	51.5	97
FEB.	225	8	96.5	94.5	261	8	97.0	110.2	98
MAR.	192	6	97.0	113.5	160	6	96.0	94.0	72
APR.	140	6	95.5	53.7	318	8	97.5	124.2	100
MAY	188	14	92.5	64.0	227	26	88.5	74.0	68
JUNE	146	6	96.0	53.2	169	6	96.5	62.0	191
JULY	660	18	97.5	187.1	535	6	99.0	154.2	84
AUG.	96	5	94.5	43.3	174	6	96.5	79.9	69
SEPT.	410	7	98.0	160.2	443	5	99.0	174.1	51
OCT.	237	17	77.5	104.6	244	16	93.5	108.4	172
NOV.	332	12	96.5	214.1	285	4	98.5	188.0	213
DEC.	230	14	94.0	151.4	214	3	98.5	147.9	179
TOTAL	-	-	-	1361.8	-	-	-	1434.7	1394
AVG.	253	10	96.0	113.5	264	8	97.0	119.6	116

COMMENTS

The average BOD loading at this plant of 253 ppm is still above the design value of 140 ppm. The average suspended solids concentration of 264 ppm is slightly more than the design value of 250 ppm. The average values of the effluent quality are better than the Commission objectives of 15 ppm for both BOD and suspended solids.

Chlorination of the final effluent is not presently practiced at the plant. Surveys of the receiving stream have indicated the necessity of providing chlorination facilities to maintain a coliform count of less than 2400 units per 100 ml in the stream. It is anticipated that these facilities will be added in 1967.

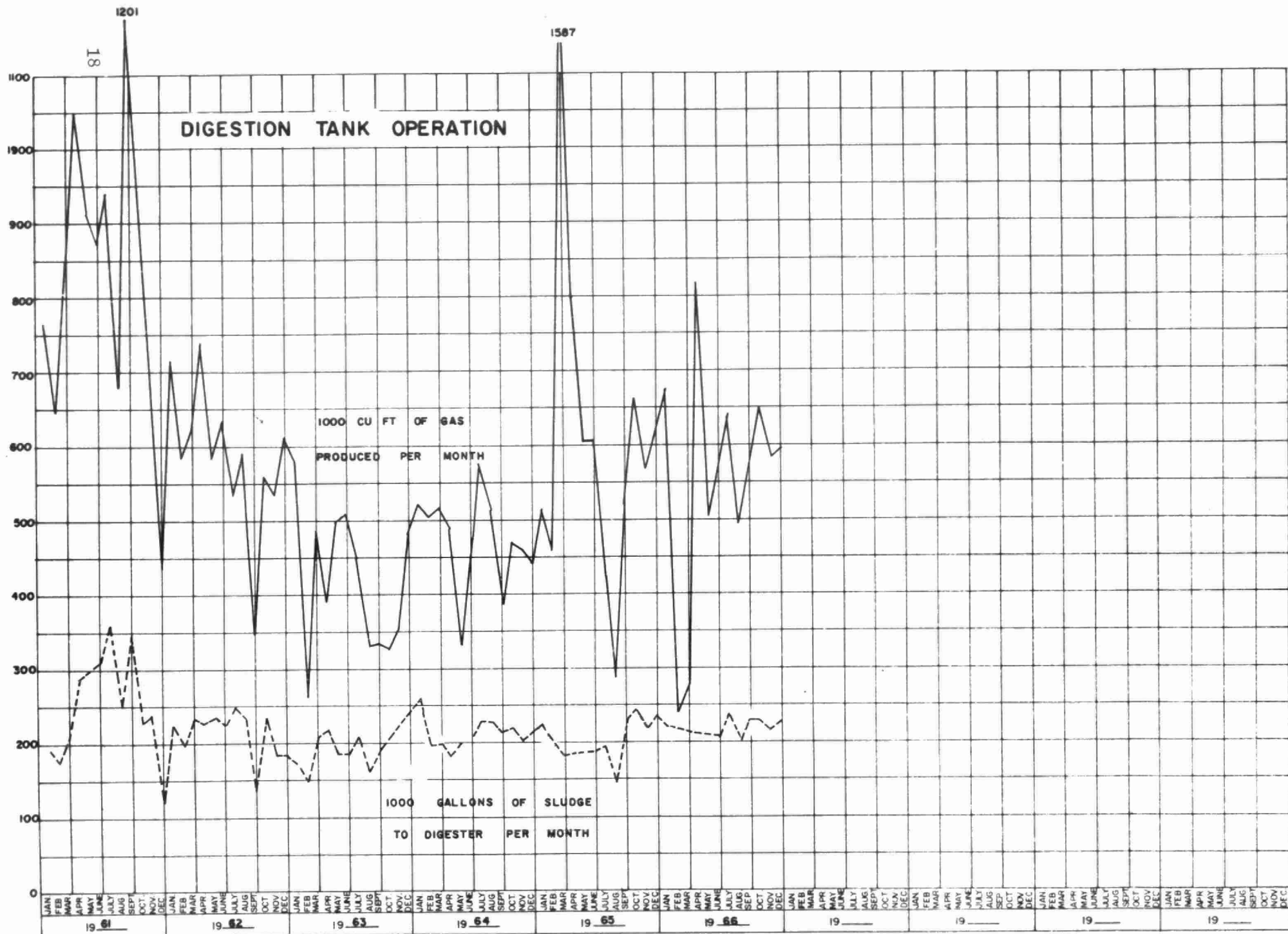


AERATION SECTION

MONTH	PRIM. EFFL. B.O.D. PPM.	MLSS. PPM.	LBS. BOD. PER 100 LBS. M. L. S. S.	CUBIC FEET AIR PER LB. BOD. REMOVED
JANUARY	91	2812	9	1458
FEBRUARY	90	2527	12	1415
MARCH	76	2451	13	1342
APRIL	54	2666	6	2215
MAY	103	2452	11	1336
JUNE	55	2609	6	2519
JULY	122	2530	9	1681
AUGUST	57	2558	-	-
SEPTEMBER	60	2637	6	2650
OCTOBER	75	2728	9	2021
NOVEMBER	110	2679	19	798
DECEMBER	52	3734	7	2072
TOTAL	-	-	-	-
AVERAGE	79	2699	10	1773

COMMENTS

The aeration loadings indicate an average BOD reduction in the primary clarifiers of 69%. The aeration loading of 10 pounds BOD per 100 pounds MLSS is considerably less than the 20 to 40 lbs. usually recommended. The MLSS have been kept at a relatively high value to counteract the foam problem. The use of fuel oil has been successful in controlling the remaining foam. The effluent quality still does not appear to be impaired by the high MLSS as experiments carried out in 1965 indicated. In fact increasing the pounds of BOD per 100 lbs. of MLSS had an adverse affect on the plant.



DIGESTER OPERATION

MONTH	SLUDGE TO DIGESTERS			SLUDGE FROM DIGESTERS			GAS PRODUCED 1000'S Cu. Ft.
	1000'S CU. FT.	% SOLIDS	% VOL. MAT.	1000'S CU. FT.	% SOLIDS	% VOL. MAT.	
JAN.	35.97	6.40	4.54	41.39	4.58	2.93	671.52
FEB.	32.37	6.26	4.70	31.18	4.08	2.77	236.32
MAR.	34.14	5.90	4.31	7.56	4.32	2.72	*
APR.	33.99	6.02	4.27	44.79	4.45	3.03	816.58
MAY	31.37	6.00	4.29	51.03	4.32	2.49	502.15
JUNE	33.34	6.68	4.38	33.45	4.84	2.68	519.02
JULY	38.06	6.27	4.38	28.54	4.15	2.94	640.51
AUG.	32.15	6.38	4.46	41.77	4.53	2.64	490.72
SEPT.	36.64	5.40	3.89	34.78	3.90	2.34	575.51
OCT.	39.62	4.98	3.81	25.54	3.53	2.50	645.92
NOV.	34.78	6.36	4.41	27.45	3.80	2.44	580.50
DEC.	36.57	5.38	3.65	26.68	3.75	2.24	597.07
TOTAL	419.00	-	-	394.16	-	-	6846.35
AVG.	34.92	6.00	4.26	32.85	4.19	2.64	570.53

* Meter out of service.

Yearly total prorated on 11 months data.

COMMENTS

Sludge volume reduction of approximately 6% indicates the fact that supernatant removal is not satisfactory, in fact this plant has never produced a satisfactory supernatant due to a lack of digester piping.

The outdoor sludge lagoon was again not used in 1966. Gas production decreased by approximately 10% from 1965. The volatile matter reduction was again 38%.



CONCLUSIONS

The data given in this report serve as a useful reference for all who are concerned with the operation of the Stratford Water Pollution Control Plant. This data will be especially valuable when the plant requires expansion in the future.

During the year, the plant has produced an excellent effluent having average values of BOD and suspended solids concentrations which met the OWRC objectives 85 and 80.5% of the time respectively.

RECOMMENDATIONS

The data shown on the flow chart indicate a high degree of storm water is entering the plant. It is recommended that, in order to postpone as long as possible a costly plant expansion (present flows are 77% of design flow), the city attempt to eliminate as much storm water as possible from the sanitary sewer system.



